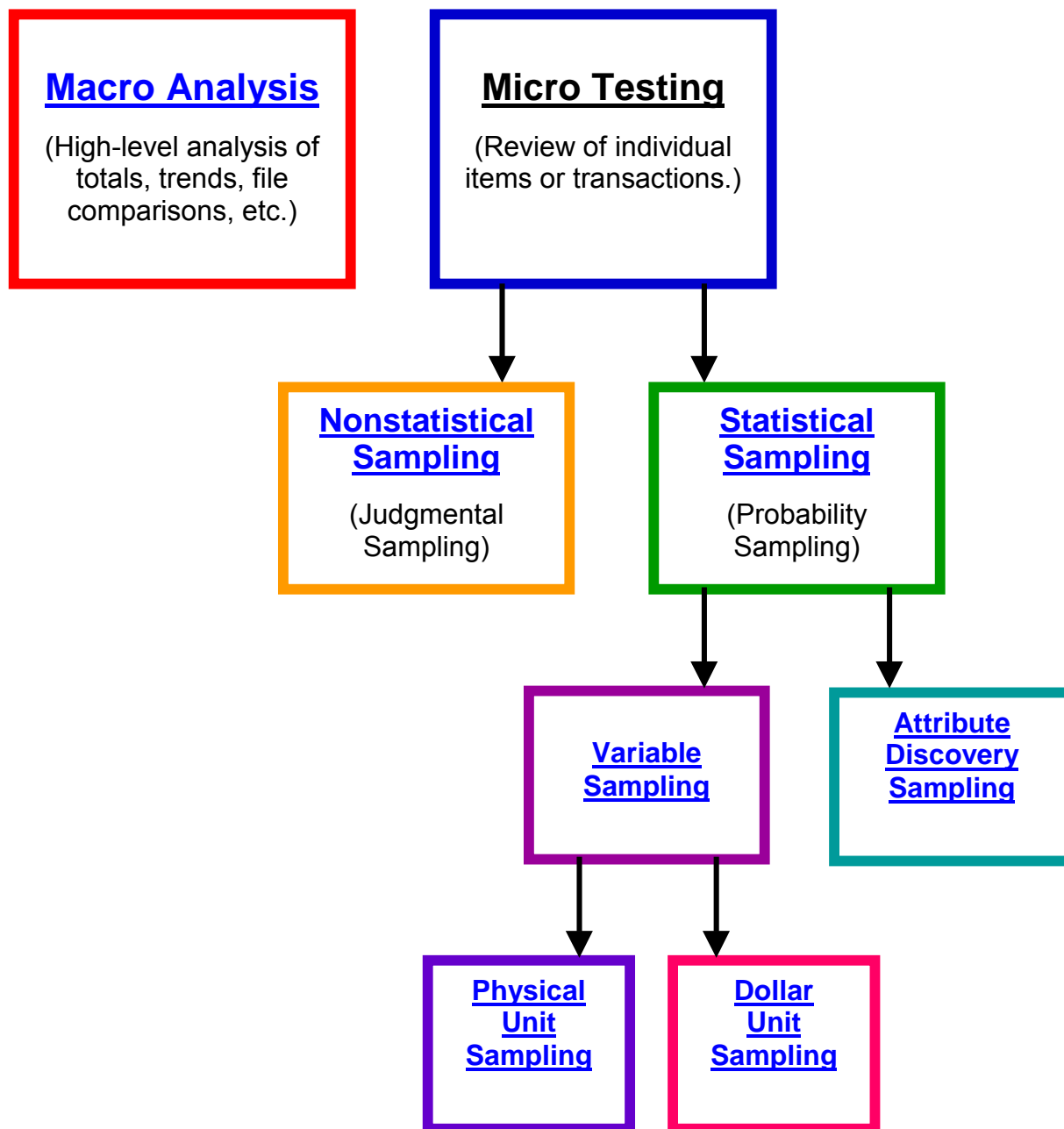
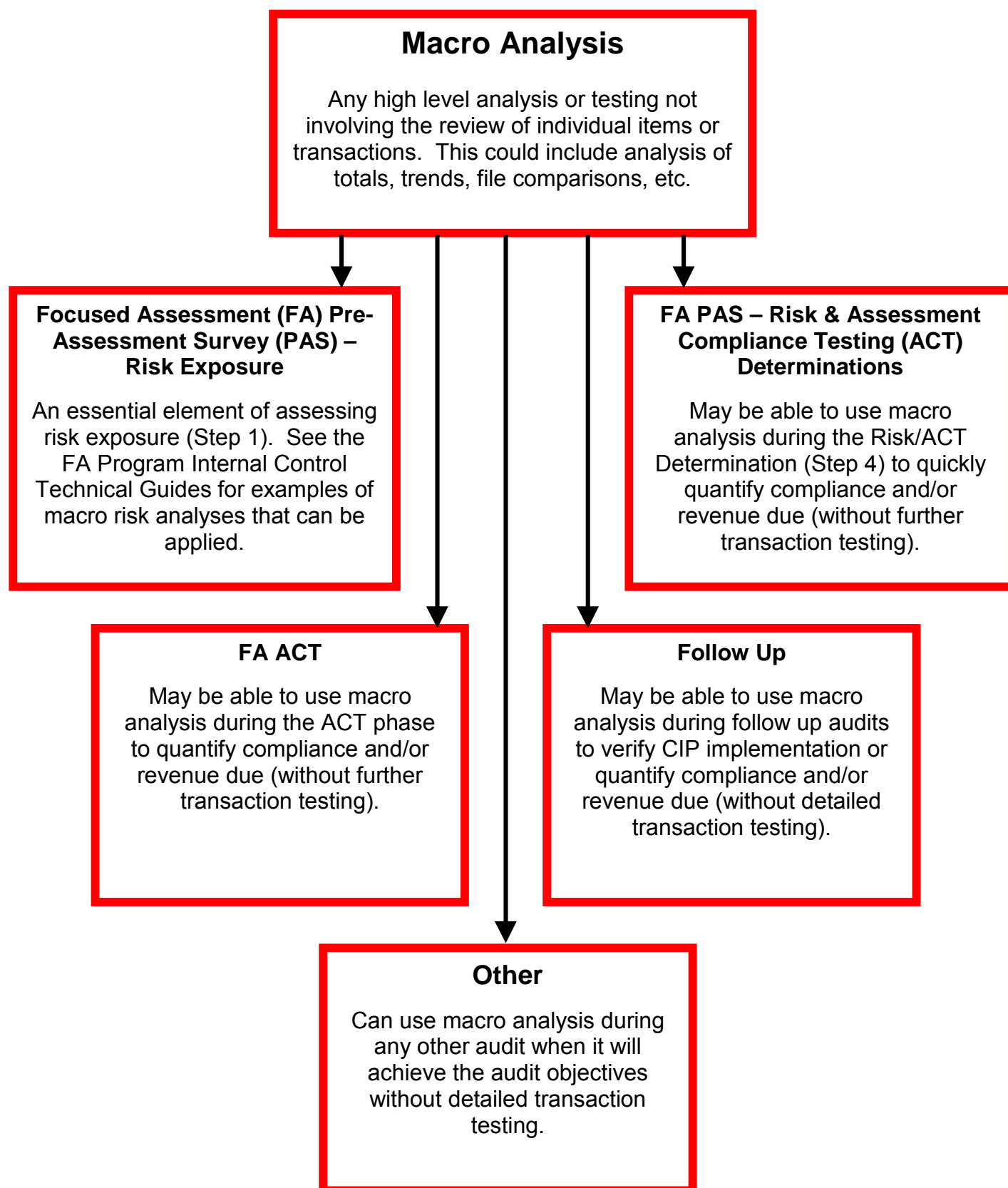


# Sampling Methodology Diagrams

## Audit Testing Methods



## Macro Analysis Appropriate Uses



## Nonstatistical Sampling Appropriate Uses

### Nonstatistical Sampling (Judgmental Sampling)

Judgmental sampling is appropriate when statistical results are not needed and/or there is a high degree of certainty that a conclusion can be reached without further sampling, AND WHEN:

#### Survey

The purpose is to survey the area in order to determine the necessity for and extent of substantive testing (further transaction testing).

- FA PAS
- Follow up
- Any other audit where a survey is appropriate to achieve the audit objectives.

#### Known Problem Area

There is a desire to concentrate audit effort in a specific limited problem area revealed by a previous sample or other source of information.

- FA ACT
- Follow up
- Any other audit where there is a specific limited problem area.

#### Very Small Universe

The universe is very small and it would be quicker and easier to review all or most of the items in the universe.

- FA ACT
- Follow up
- Any other audit where the universe is very small.

#### Very Sensitive Area

The area is very sensitive and there is no room for error or exact results are needed so all of the items in the universe must be reviewed.

- Fraud
- Any other very sensitive audit where there is no room for error or where exact results are needed.

## Nonstatistical Sampling Sample Sizes

### Nonstatistical Sampling (Judgmental Sampling)

Nonstatistical sample sizes are generally small and will vary depending on the application and area being reviewed.



#### FA PAS

Sample sizes will be 1 to 20, depending on the results of the initial risk exposure and internal control assessment.

Low risk exposure and strong internal controls = low end of 1 to 10 range.

Low risk exposure and adequate internal controls = middle of 1 to 10 range.

Low risk exposure and weak internal controls = high end of 1 to 10 range.

Moderate risk exposure and strong internal controls = low end of 5 to 15 range.

Moderate risk exposure and adequate internal controls = middle of 5 to 15 range.

Moderate risk exposure and weak internal controls = high end of 5 to 15 range.

High risk exposure and strong internal controls = low end of 10 to 20 range.

High risk exposure and adequate internal controls = middle of 10 to 20 range.

High risk exposure and weak internal controls = high end of 10 to 20 range.



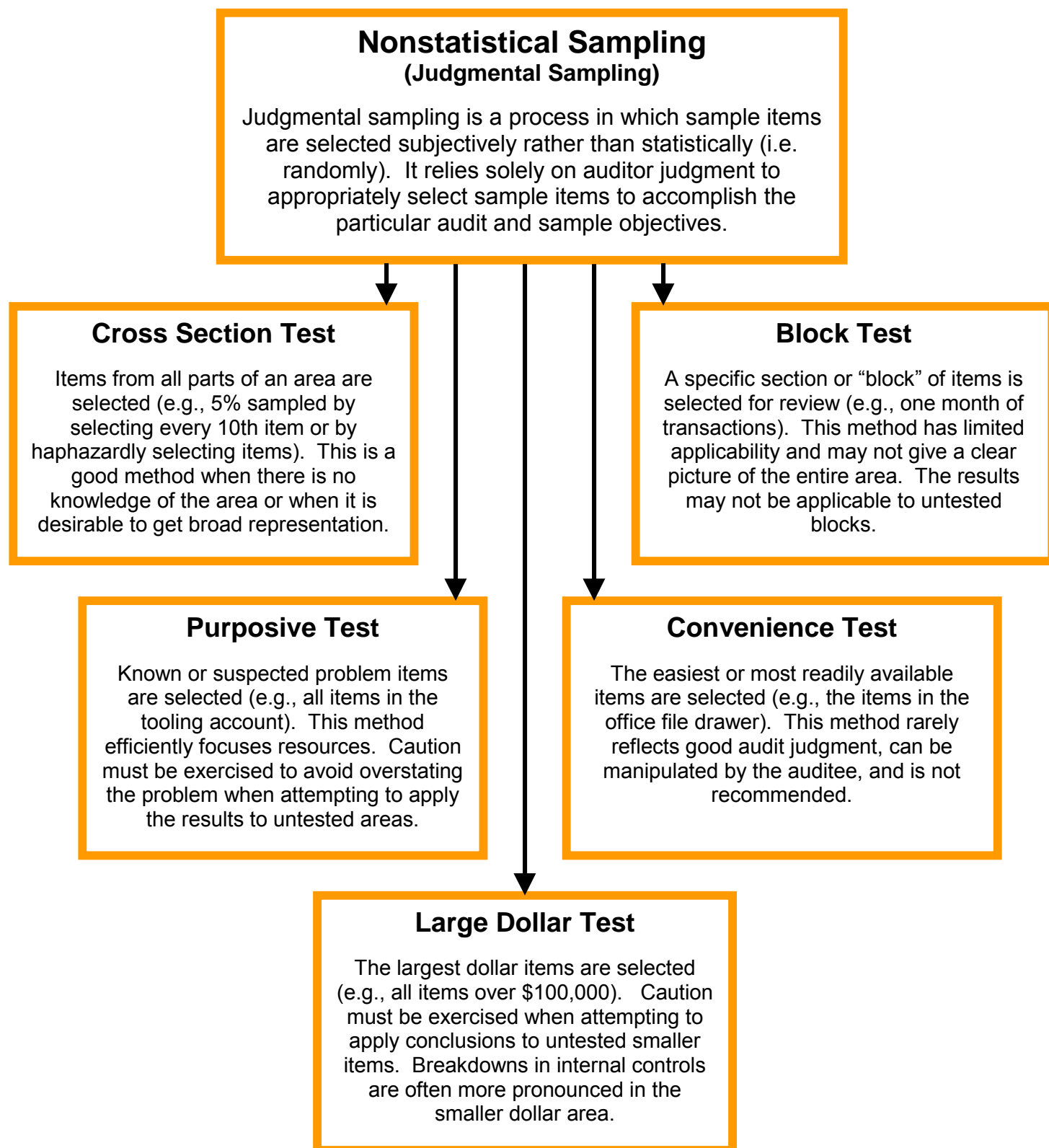
#### All Other Audits

Sample sizes will generally be 100% of the review area.

Judgmental sample sizes generally should not significantly exceed a normal statistical sample of 60 to 100.

If the area is much larger than that, then statistical sampling should be considered instead.

## Nonstatistical Sampling Common Selection Methods



## Nonstatistical Sampling Evaluation Methods

### Nonstatistical Sampling (Judgmental Sampling)

Judgmental sampling, by definition, relies solely on auditor judgment to evaluate sample results. That is, statistical analysis is not used to evaluate judgmental sample results.

#### 100% Reviews

When the judgmental sample represents 100% of the review area, then the sample results represent actual results for the review area.

If the review area represents only part of the entire area being evaluated/reported on, then the review area results must be analyzed within the context of the entire area under evaluation.

#### < 100% Reviews

When the judgmental sample does not represent 100% of the review area, then the sample results must be evaluated by the auditor to determine if the audit and sample objectives have been achieved and if an opinion on the review area can be expressed.

It is generally not appropriate to compute compliance rates or project dollar impacts (revenue or value) based on the results of small nonstatistical samples.

## Statistical Sampling Basic Categories

### Statistical Sampling (Probability Sampling)

Statistical sampling is an objective process for testing a limited number of transactions in order to draw a conclusion about a larger universe. It uses a sampling plan in such a way that the laws of probability can be used to make statements or generalizations about the universe.

Statistical sampling is appropriate when the universe is too large to review 100% and statistical results are needed (i.e. to statistically project the sample results to the universe).



### Variable Sampling

Variable sampling is a form of substantive testing of dollars that is quantitative in nature and results in better estimates of amounts. Sample items are evaluated for error amounts or variables. Variable sampling answers the question “how much?”



### Attribute Sampling

Attribute sampling is a form of compliance testing that is qualitative in nature, can be used to determine the rate of occurrence, and may result in system changes. Sample items are evaluated for compliance or attributes. Attribute sampling answers the question “how many?”

## Variable Sampling Types

### Variable Sampling

Variable sampling is a form of substantive testing that is quantitative in nature, can be used to determine the amount of variance, and may result in dollar impacts.

There are 2 basic types of variable sampling based on the sampling unit selected.

#### Physical Unit

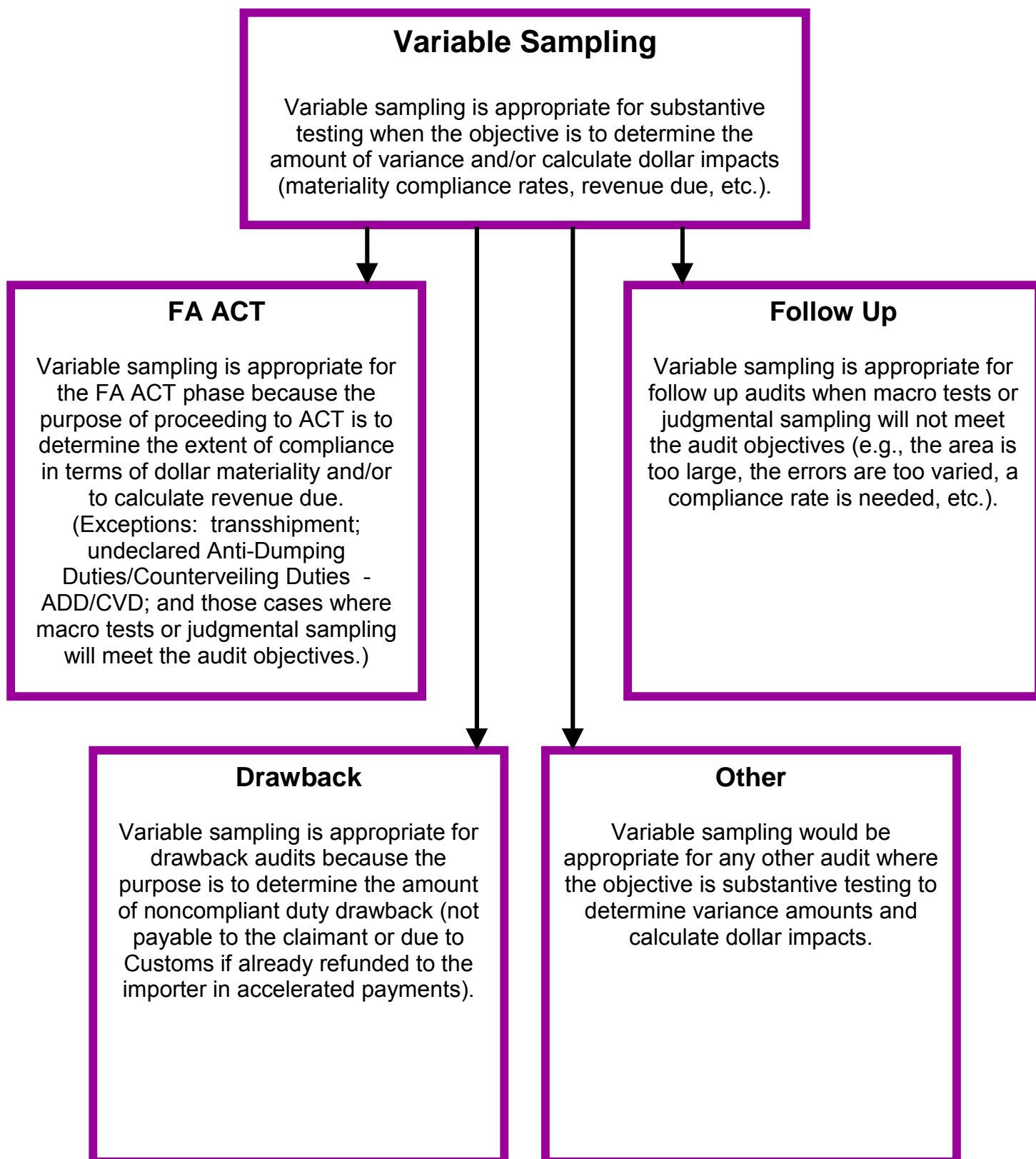
Physical unit sampling is a type of variable sampling in which the sampling unit is defined as a physical item or transaction, with each physical item or transaction having an equal chance of selection (or determinable non-zero chance of selection in the case of stratification). Physical unit sampling directly selects physical units (items, transactions, etc.) for examination.

#### Dollar Unit

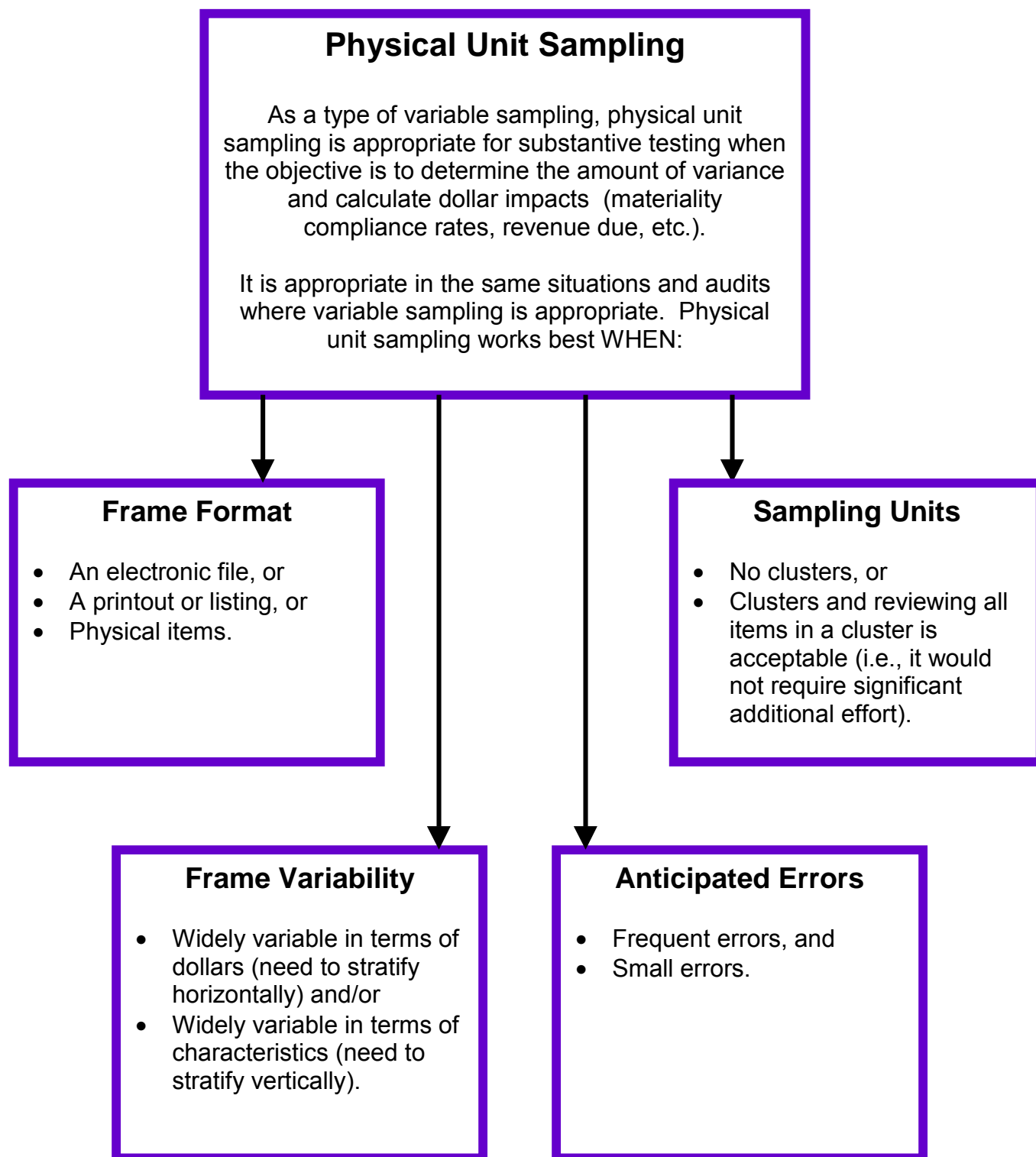
Dollar unit sampling is a type of variable sampling in which the sampling unit is defined as an individual dollar, with each dollar having an equal chance of selection. Dollar unit sampling selects individual dollars, which are then tied to physical units (items, transactions, etc.) that are examined.



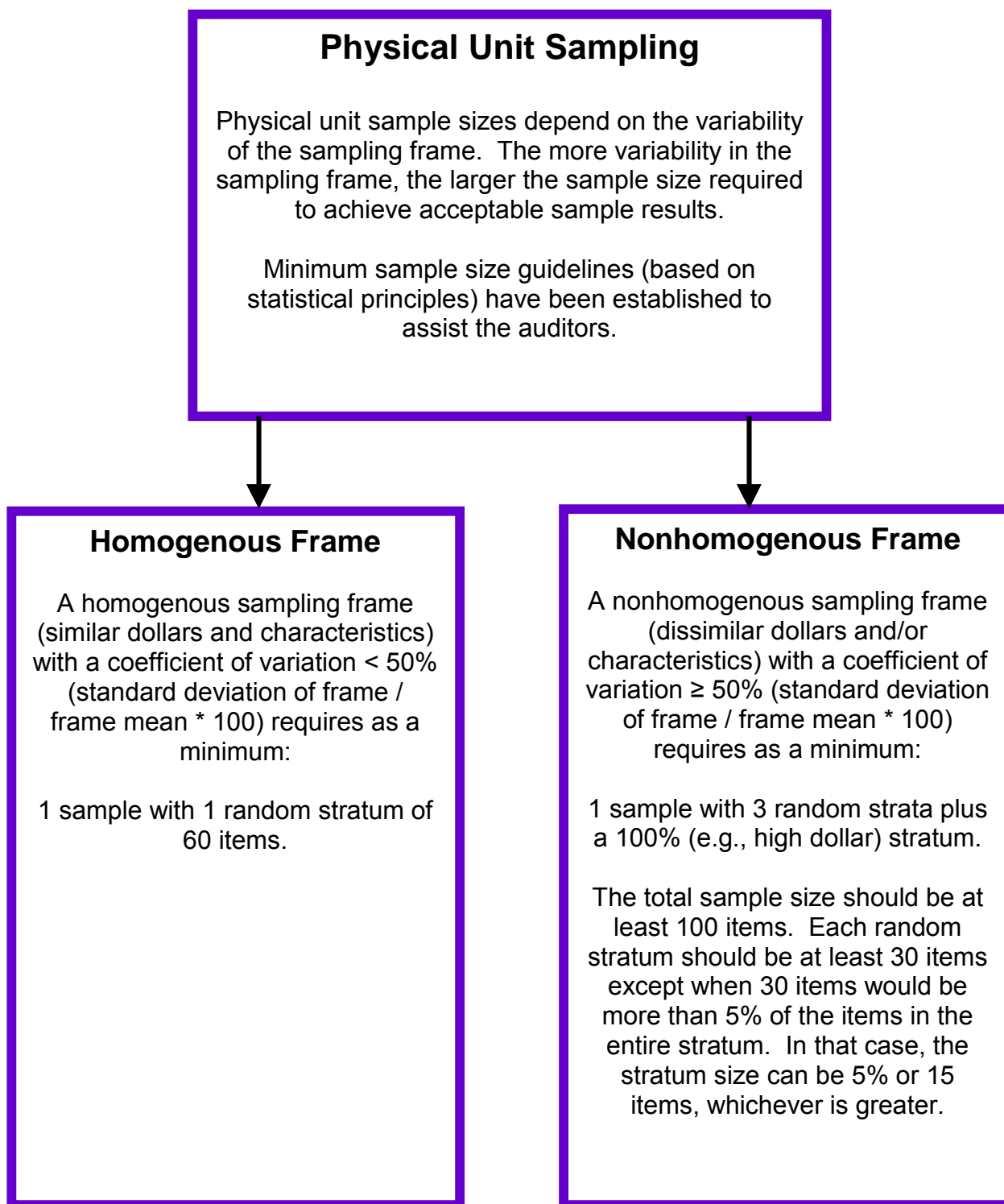
## Variable Sampling Appropriate Uses



## Physical Unit Sampling Appropriate Uses



## Physical Unit Sampling Minimum Sample Sizes



## Physical Unit Sampling Selection Methods

### Physical Unit Sampling

Valid statistical methods require that each physical sampling unit (item or transaction) has an equal or determinable nonzero chance of selection and that each sampling unit is randomly selected.

#### EZ-Quant RANUM

(Random Numbers Generator)

A computer procedure that generates random numbers which can then be used to select sample items. It works with an electronic frame, a numbered printout or listing frame, or a numbered physical frame.



#### EZ-Quant RASEQ

(Random Number Sets Generator)

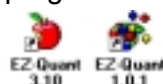
A computer procedure that generates sets of random numbers which can then be used to select sample items. It works with an unnumbered printout or listing, or an unnumbered physical frame.



#### EZ-Quant STRAT

(Physical Unit Sample Selection Procedure)

A computer procedure that automatically stratifies a universe into equal dollar strata and randomly selects sampling units in each stratum. It requires an electronic frame or small printout/listing that can be typed into the program.



#### Manual Systematic Interval

A manual selection method that selects every  $n$ th item by means of a fixed interval with a random start. It should only be used with an unnumbered physical frame when it would produce a better cross-section or would be quicker and easier than using RASEQ.

#### Other Computer Programs

Other programs, such as Microsoft Access or SAS, may be used if the electronic frame is too large to fit into Microsoft Excel (for analysis, manual stratification, or application of EZ-Quant RANUM) or too large to fit into EZ-Quant STRAT (for stratification and/or sample selection).

## Physical Unit Sampling Evaluation Methods

### Physical Unit Sampling

An essential phase of statistical sampling, including physical unit sampling, is the statistical evaluation of the sample results.



#### EZ-Quant SAMPL

(Physical Unit Sample Evaluation Procedure)

A computer procedure that projects the physical unit sample results to the universe and provides reliability measures for evaluating that projection.

The procedure provides two point estimates (one for the ratio method and one for the difference method) along with associated precision dollars and confidence intervals based on the confidence level specified. The point estimate with the lowest precision percentage (precision dollars / point estimate) should be selected and its precision percentage compared to the desired precision percentage from the sampling plan when determining the acceptability of the point estimate.

Sampling parameters should be 95% confidence level and < 100% precision percentage.

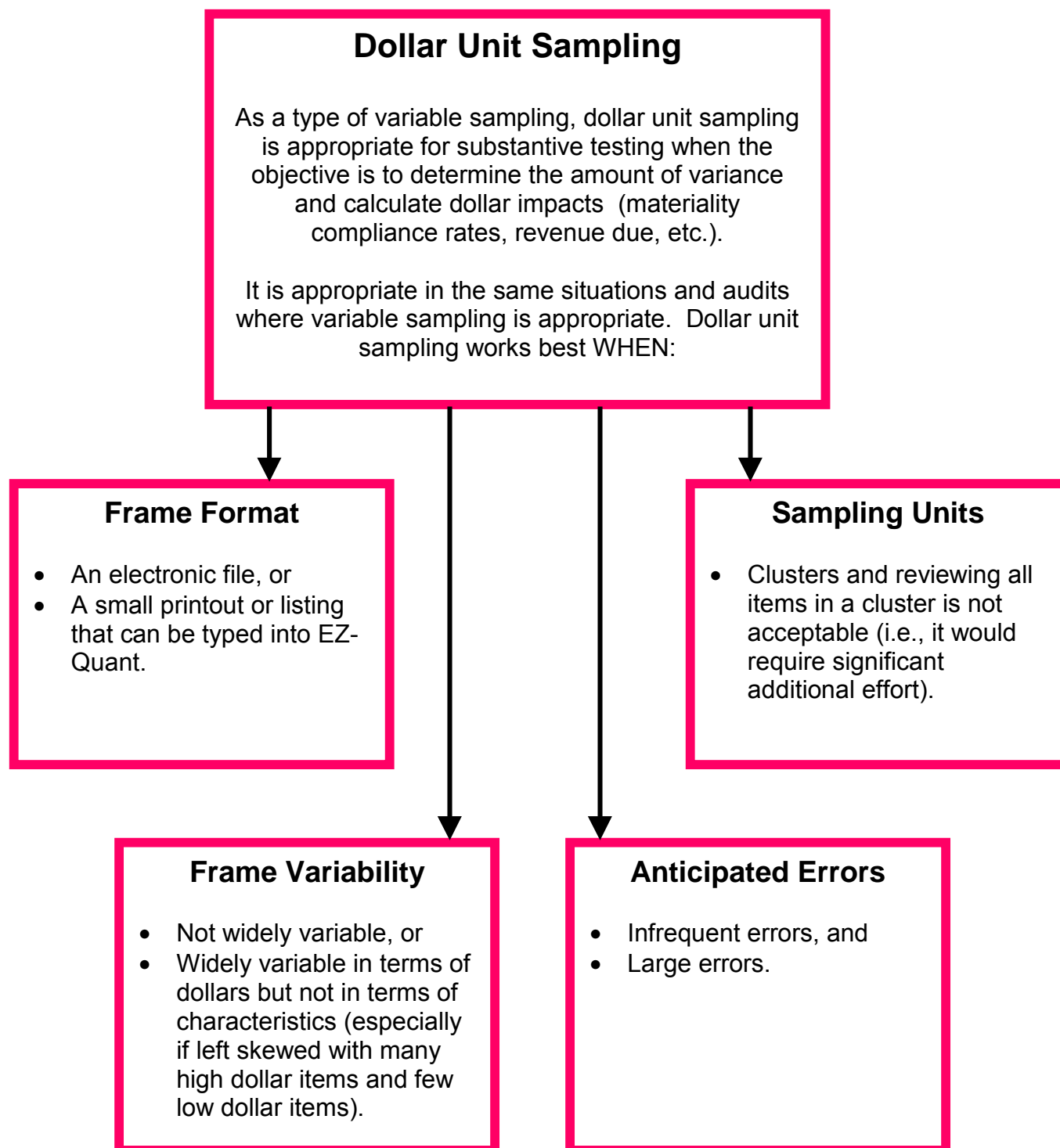


#### Other Computer Programs

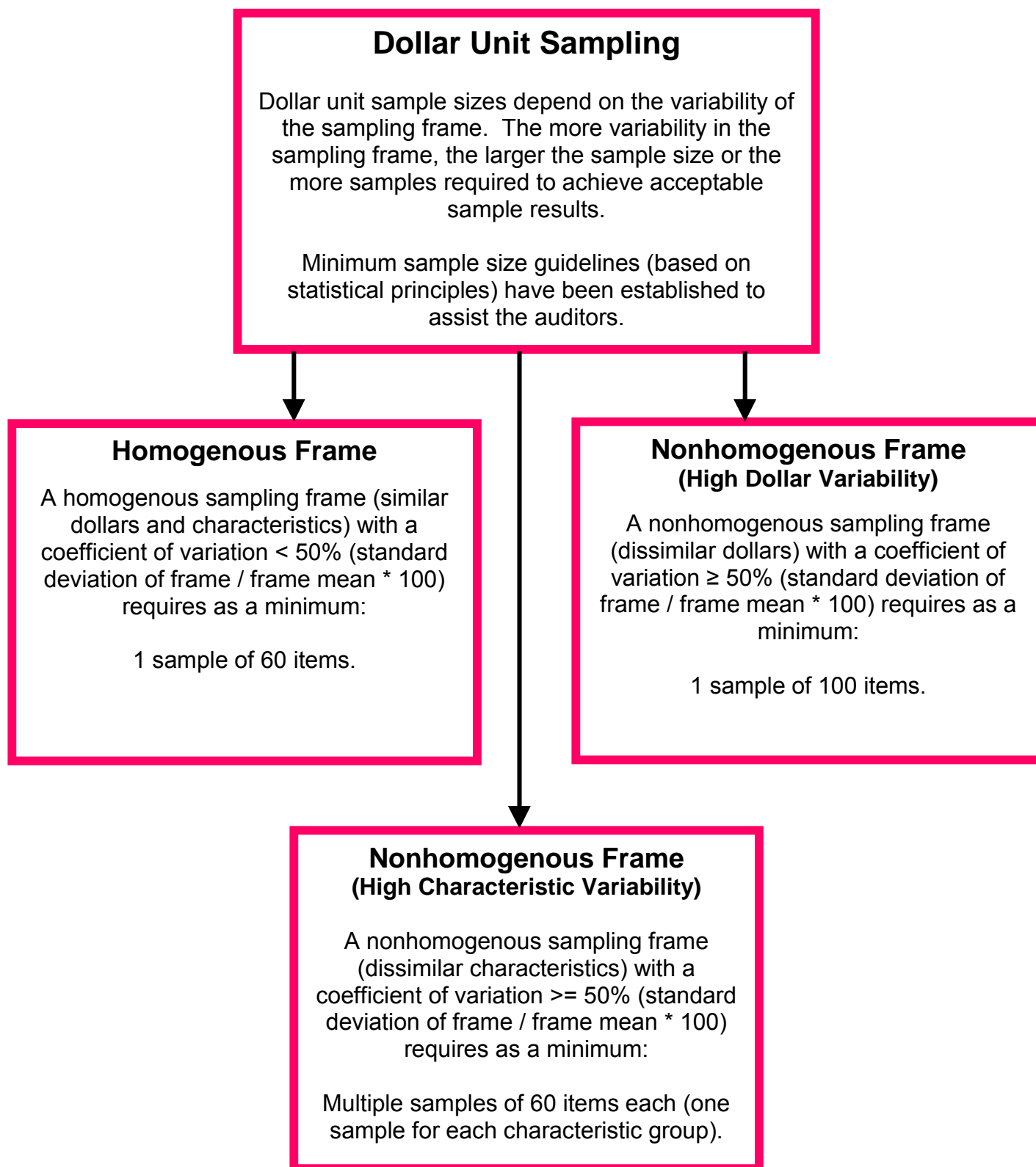
Other computer programs, such as Microsoft Access or SAS, may be necessary to statistically project and evaluate the sample results if the electronic file is too large for EZ-Quant SAMPL.

Sampling parameters should be 95% confidence level and < 100% precision percentage.

## Dollar Unit Sampling Appropriate Uses



## Dollar Unit Sampling Minimum Sample Sizes



## Dollar Unit Sampling Selection Methods

### Dollar Unit Sampling

Valid statistical methods require that each sampling unit (i.e. dollar) has an equal chance of selection and that each sampling unit is randomly selected.

#### EZ-Quant DUSSEL

##### (Dollar Unit Sample Selection Procedure)

A computer procedure that automatically selects dollar units using a systematic interval method. It requires an electronic frame or small printout/listing that can be typed into the program.



#### Manual Systematic Interval

A manual selection method that selects every *nth* dollar by means of a fixed interval with a random start. While possible to use with a printout/listing frame, it is generally not recommended due to the amount of effort required to manually select the dollar hits.

#### Other Computer Programs

Other programs, such as Microsoft Access or SAS, may be used if the electronic frame too large to fit into Microsoft Excel (for analysis) or too large to fit into EZ-Quant DUSSEL (for sample selection).



## Dollar Unit Sampling Evaluation Methods

### Dollar Unit Sampling

An essential phase of statistical sampling, including dollar unit sampling, is the statistical evaluation of the sample results.



#### EZ-Quant DUSAM

(Dollar Unit Sample Evaluation Procedure)

A computer procedure that projects the dollar unit sample results to the universe and provides reliability measures for evaluating that projection.

The procedure provides a point estimate along with associated precision dollars and confidence intervals based on the confidence level specified. The achieved precision percentage (precision dollars / point estimate) should be compared to the desired precision percentage from the sampling plan when determining the acceptability of the point estimate.

Sampling parameters should be 95% confidence level and < 100% precision percentage.



#### Other Computer Programs

Other computer programs, such as Microsoft Access or SAS, may be necessary to statistically project and evaluate the sample results if the electronic file is too large for EZ-Quant DUSAM.

Sampling parameters should be 95% confidence level and < 100% precision percentage.

## Attribute Discovery Sampling Appropriate Uses

### Attribute Discovery Sampling

Attribute discovery sampling is a special kind of attribute acceptance sampling where the occurrence of even a single error constitutes a failure of the universe.

Attribute discovery sampling is appropriate when the risk of erroneous rejection of a universe is immaterial, the purpose is not to determine dollar compliance rates or project revenue, AND:

#### Any Systemic Error = Noncompliance

The area is sensitive and any systemic error would constitute noncompliance and/or potential fraud.

- **FA ACT Unacceptable Risk Areas of Transshipment and Undeclared ADD/CVD.**
- **Follow Up of Transshipment and Undeclared ADD/CVD.**

#### No Anticipated Errors and/or Errors Result in Penalties Rather than Revenue Due

No error is expected in the universe (a low risk universe).

- **Broker.**
- **Bonded Warehouse.**

## Attribute Discovery Sampling Sample Sizes

### Attribute Discovery Sampling

Attribute discovery sample sizes will vary depending on the universe size and sampling parameters.

The larger the universe and the tighter the sampling parameters (the higher the confidence level, the lower the critical error rate, and the lower the government risk), the larger the required sample size.



### **EZ-Quant ATTDISC** (Attribute Sample Size Determination Procedure)

A computer procedure that calculates the sample size required to achieve the attribute sample objective based on the universe size and specified sampling parameters.

Sample sizes computed will generally be in the range of 59 to 90.

Sampling parameters when any systemic error results in noncompliance are 5% critical error rate and 1% government risk.

Sampling parameters when no errors are anticipated or errors result in penalties rather than revenue due are 5% critical error rate and 5% government risk.



## Attribute Discovery Sampling Selection Methods

### Attribute Discovery Sampling

Valid statistical methods require that each sampling unit has an equal or determinable nonzero chance of selection and each sampling unit is randomly selected.

#### EZ-Quant RANUM

(Random Numbers Generator)

A computer procedure that generates random numbers which can then be used to select sample items. It works with an electronic frame, a numbered printout or listing frame, or a numbered physical frame.



#### EZ-Quant RASEQ

(Random Number Sets Generator)

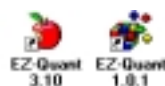
A computer procedure that generates sets of random numbers which can then be used to select sample items. It works with an unnumbered printout or listing, or an unnumbered physical frame.



#### EZ-Quant STRAT

(Physical Unit Sample Selection Procedure)

A physical unit sample selection computer procedure that may be used for attribute discovery sample selection by specifying 1 stratum and no high dollar stratum items. It requires an electronic frame or small printout/listing that can be typed into the program.



#### Manual Systematic Interval

A manual selection method that selects every  $n$ th item by means of a fixed interval with a random start. It should only be used with an unnumbered physical frame when it would produce a better cross-section or would be quicker and easier than using EZ-Quant RASEQ.

#### Other Computer Programs

Other programs, such as Microsoft Access or SAS, may be used if the electronic frame is too large to fit into Microsoft Excel (for application of EZ-Quant RANUM) or too large to fit into EZ-Quant STRAT (for sample selection).

## Attribute Discovery Sampling Evaluation Methods

### Attribute Discovery Sampling

The purpose of attribute discovery sampling is to determine if any error (usually systemic) exists in the universe. Any such sample error would result in a failed universe or determination of noncompliance.

#### EZ-Quant SAMPL (Physical Unit Sample Evaluation Procedure)

Since attribute discovery samples are selected using physical unit procedures, the EZ-Quant SAMPL Physical Unit Sample Evaluation Procedure may be used to project dollar impacts (e.g., value or revenue) when applicable.

Sampling parameters should be 95% confidence level and < 100% precision percentage.

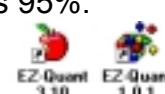


#### EZ-Quant ATTEVAL1 (Attribute Discovery Acceptance Sample Evaluation Procedure)

If it is necessary to estimate the total error rate in the universe, the EZ-Quant ATTEVAL1 attribute discovery acceptance sample evaluation procedure may be used for this purpose.

The confidence level when any systemic error results in noncompliance is 99%.

The confidence level when no errors are anticipated or errors result in penalties rather than revenue due is 95%.



#### Other Computer Programs

Other computer programs, such as Microsoft Access or SAS, may be necessary to statistically project and evaluate the sample results if the electronic file is too large for EZ-Quant SAMPL.

Sampling parameters should be 95% confidence level and < 100% precision percentage.